2016

674-94 Database Management

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INFO 674: Database Management for MBAs

COURSE SYLLABUS (Summer 2016)

CLASS LOCATION AND TIME: Smith Hall 251, Tuesday & Thursday, 6:00pm – 9:15pm

INSTRUCTOR

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Williams College of Business Mission
"We educate students of business, enabling them to improve organizations and society, consistent with the Jesuit tradition."

TEXT (Available online via Xavier's Library)
Data Management: Databases and Organizations (6e, 5e) by Richard Watson
(ISBN: 978-1943153039 or 978-0471715368)

Pre-requisites:
A basic working knowledge of Excel

Course Description
The word "database" is a ubiquitous term used to explain everything from the simplest Excel spreadsheet sorting your movie collection to the most complicated data storage technologies used by companies like Facebook, Google and Amazon. We interact with databases every day to keep track of a myriad of details—both in business and our personal lives. This class answers the questions of what a database really is and how do they supplement business functions. We explore the rapid growth in data collection, storage and analytics as well as learning how to design, query and interact with relational database systems.

This course is designed for a graduate student in business who has no prior experience with database systems. It covers the fundamentals of database design, structured query language, security, analytics and how databases play a strategic role in organizations. These topics are explored from the perspective of both a data user and a data manger, however the goal of the course is ***NOT*** to train database administrators. Rather, the class is taught with the goal of teaching business analysts how to interact with and manage databases and the environments in which they function.

Learning Objectives
Upon completion of this course, you should be able to:

- Understand the organizational benefits and issues related to data management
- Develop a valid data model for a business system of medium complexity
- Build and use a relational database
- Formulate a wide range of relational database queries using structured query language (SQL)
- Be familiar with the principles of managing organizational data
- Be familiar with the design principles and technology used to manage and exploit organizational intelligence
- Be familiar with the security and ethical issues surrounding the management of data

WCB Learning Goals and Objectives
This course reinforces the following MBA program learning goals:

Strategic Thinking and Leadership

- Ability to demonstrate the appropriate knowledge of database management in strategic thinking

Ethics and Social Responsibility

- Ability to foster an ethical climate in their roles and responsibilities in business and society

Critical Thinking

- Ability to clarify problems, generate and evaluate alternatives using appropriate data management techniques and draw conclusions

Effective Written and Oral Communication

- Ability to communicate complex subjects and solutions in accessible ways to others

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My vision for this semester
In the last decade we have seen an explosion in the quantity of data available to businesses. Transactional data from point-of-sale scanners are now routinely available, data from direct marketing is growing exponentially, e-commerce and web-browsing data is everywhere, and metadata is so great in number it cannot all be stored. Managing this data is becoming increasingly important and the debate surrounding how to do so is becoming increasingly heated. My vision of this course is to present and discuss database technologies and their application to businesses to improve operations and strategy.

Academic Assessment
The class will consist of the following methods of assessment:

Individual homework assignments
Homework consists of short reflection papers on data related articles, as well as 4 labs that will test your knowledge of SQL and data modeling techniques. These labs will be much easier with the help of a computer with Microsoft Access or MySQL, again reinforcing the suggestion that you install the software on a personal computer you have access to off-campus. All articles will be provided free via the library or Canvas.

Exams
There will be one midterm exam and a comprehensive final exam. These exams will cover material from the textbook, readings, assignments and software usage. Both exams will be completed **in-class and require the use of a computer.**

Group Project
Each group will be responsible for completing a group project that involves designing and creating a relational database, associated data model and sample queries to supplement a businesses' operations. The database must be able to meet the requirements of the business (the list of requirements is specified in the assignment available on Canvas.) The project deliverables include:

- Data Dictionary and Schema explanation
- Sample database with at least 10 entries in one table submitted as a Microsoft Access file (.accdb) or MySQL Workbench export (.sql)
- Graphic data model
- Queries:
    - A description of 6 queries, 3 of which should be complex (i.e. use more than 3 joins, group by, sub queries, etc.)
    - Output from each query
    - Justification for each query
    - The SQL code to create each query

In my experience, most students work effectively in teams, however it is not uncommon for some team members to not carry their fair share of the load. As a result, a peer evaluation will be conducted at the end of the term. The results of your evaluation will scale your final group project grade.

In-class participation & group assignments
Most class periods will include one or more group activities. Participation in these activities and other in-class involvement constitute this category. We will also be completing a number of assignments in-class that will lay the foundation for your homework and other assignments. Thus, it is imperative that you **attend class regularly, otherwise you will find yourself with significantly more homework!**

Group Presentation:
During the term each group will be responsible for leading discussion on an article and topic in database management. This will include:

- A 10 to 20-minute presentation summarizing the article, topic and your external research
- At least 3 external references / up-to-date supplementary research on the topic
- At least 3 thought provoking questions for the class (to encourage discussion)
  "What do you think of the article?" is not a thought provoking question…

In our second class period, each group will choose the topic and associated date for their presentation from the following list: (articles available on Canvas)

July 19	**Introduction / Data Modeling:** *"Does data modeling still matter?"*
July 21	**What Data Can Do:** *"Where predictive analytics is having the biggest impact"*
July 28	**Responsible Data / Ethics:** *"With big data comes big responsibility"*
August 2	**Database Design***: "Seven deadly sins of database design"*
August 4	**Security***: "Why you should care about the Target data breach"*
August 9	**NoSQL:** *"NoSQL vs RDBMS - Why there is room for both"*

Before each presentation, everyone in the class not in the presenting group will come prepared with a summary reflection on the assigned reading (1/2-1 page, double spaced, 12-point font.) This reflection should be submitted on canvas before the class period and should include your personal thoughts on the article.

Course Grading
Student performance will be evaluated on the following basis:

In-Class Participation / Group Assignments	10%
Individual Homework Labs	15%
Group Presentation / Discussion Lead	10%
Final Group Project	20%
Midterm Exam	20%
Final Exam	25%

General Course Policies

- Given the nature of our short course, attendance at every class is paramount to a successful learning experience. While I don't take attendance per se, most class periods will include small group assignments that will be turned-in

- Assignments are to be submitted on the due date. Late assignments will not be accepted unless prior arrangements have been made with the instructor. A score of 0 will be recorded for any assignment received after the due date.

- Grade tracking and averaging is the responsibility of the student. Canvas will be kept up-to-date for your convenience.

- All communication from me will be through Canvas and email. I usually respond to email within an hour of receipt if I'm not sleeping. (It's the millennial in me!) I always respond within 12 hours. If I do not respond within 12 hours, I may have missed your email, and you should bother me again. I expect others to respond with 24 hours (we aren't all addicted to our electronic notifications like me!)

Class Technology Policies

This class utilizes Microsoft Access and Oracle's MySQL server and workbench. All software we use in class will be provided to student personal computers free of charge. It is **STRONGLY** recommended that students bring and use their own laptop computers in class for assignments and class work. If you do not have a personal laptop available to you, accommodations will be made so you can still succeed in the class. **I expect technology use to be appropriate in nature.** If I observe another student becoming distracted with your non-class-related technology use, I may ask you not conduct such behavior in class.

If you use an Apple computer, I can also provide a copy of Microsoft Windows that can be installed in addition to your OS X operating system. If you would like help with this process, or if you desire other Microsoft software for free including Access, Project, SQL Server, etc., please let me know and I can provide it free of charge via the Microsoft Dreamspark Network.

Plagiarism, Cheating and group work:

Access and MySQL are amazing applications that keep track of every operation performed. This information is also written to their saved data files, making it incredibly easy to identify plagiarism by the digital fingerprint left behind on saved data files. **PLEASE** do not be tempted to submit a classmate's data file as your own! Direct and unattributed use of another's efforts is prohibited as is the use of any work untruthfully submitted as one's own. The penalty for violation of this policy will be a zero for that assignment if it is a first offense. **Subsequent violation will result in an F for the course.**

I do strongly encourage group work, but please make sure you complete and submit your own assignments. You need to understand the material on your own or you may not perform well on the exams.

Qualified students with disabilities who will require disability accommodations in this class are encouraged to make their requests to me by sharing their Accommodation Letters with me at the beginning of the semester either during office hours or by appointment. Disability related information is confidential. If you have not previously contacted Disability Services, I encourage you to do so by phone at 513-745-3280, in person on the Fifth Floor of the Conaton Learning Commons, Room 514, or via e-mail to Cassandra Jones at jonesc20@xavier.edu, to coordinate reasonable accommodations as soon as possible as accommodations are not retroactive.

It is my goal that this class be an accessible and welcoming experience for all students. If you are a student with a disability who may have trouble participating or effectively demonstrating learning in this course, contact me to arrange an appointment to share your Accommodation Letters from Disability Services and to discuss your needs. Disability related information is confidential. If you have not contacted Disability Services (located in the Learning Assistance Center) to arrange accommodations, I encourage you to do so by contacting Cassandra Jones, by phone at 513-745-3280, in person on the Fifth Floor of the Conaton Learning Commons, Room 514, or via e-mail at jonesc20@xavier.edu as soon as possible as accommodations are not retroactive.

Class Schedule

(This is simply a guide and WILL be changed periodically. Check Canvas for changes)

DATE	Topics Covered	Book Chapter	Due
July 5	Syllabus, Introduction to Data Management and Databases, Software Installations, Dreamspark, Introduction to Modeling and SQL	Ch 1 & 2	
July 7	The single Entity, Intro to: Modeling, MySQL and Microsoft Access	Ch 3	
July 12	The basics of SQL, the One to Many Relationship, SQL Joins	Ch 4	
July 14	The Many to Many Relationship, More SQL, One-to-one and Recursive relationships	Ch 5 & 6	Lab 1
July 19	One-to-one and Recursive relationships continued, Data Modeling,	Ch 7 & 8	**Article Reflection:** "Does data modeling still matter?"
July 21	More SQL, Normalization, errors, more data modeling methods, architecture design	Ch 8	Lab 2 **Article Reflection:** "Where predictive analytics is having the biggest impact"
July 26	**Exam 1**		
July 28	Spatial DB/GIS, In database analytics, ETL, ODBC, Interfacing with R, and JMP		Lab 3 **Article Reflection:** "With big data comes big responsibility"
Aug 2	Data Security, Encryption, Hardware, Backups and preventing accidental or malicious data loss, RAID, Group Project Work		**Article Reflection:** "Seven deadly sins of database design"
Aug 4	Big Data, IoT, NoSQL (XML, MongoDB, Cassandra, etc.), Hadoop, Group Project Work		Lab 4 **Article Reflection:** "Why should you care about the Target data breach?"
Aug 9	Cloud DB (with RDS), web integration with PHP, Group Project Work		**Article Reflection:** "NoSQL vs RDBMS - Why there is room for both"
Aug 11	**Final Exam**		Final Group Project